

BEST AVAILABLE COPY



PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : H01M 2/02, 2/10</p>	<p>A1</p>	<p>(11) International Publication Number: WO 97/38453</p> <p>(43) International Publication Date: 16 October 1997 (16.10.97)</p>
<p>(21) International Application Number: PCT/IB97/00339</p> <p>(22) International Filing Date: 3 April 1997 (03.04.97)</p> <p>(30) Priority Data: 96/04523 11 April 1996 (11.04.96) FR</p> <p>(71) Applicant (for all designated States except US): PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): VAN LERBERGHE, Steven [FR/FR]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).</p> <p>(74) Agent: CHAFFRAX, Jean; Internationaal Octrooibureau B.V., P.O. Box 220, NL-5600 AE Eindhoven (NL).</p>		<p>(81) Designated States: JP, KR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i></p>
<p>(54) Title: ACCUMULATOR DEVICE FOR AN ELECTRIC AND/OR ELECTRONIC APPARATUS</p> <p>(57) Abstract</p> <p>This device is formed by a casing (9) comprising a frame (10) and caps (12 and 13) for inserting an active electrical energy accumulator element (1). For obtaining a slender structure which can sustain a growing pressure notably caused by the charging cycles, the casing is curved. Application to portable telephones.</p> <div data-bbox="1161 1123 1453 1333" data-label="Image"> <p>The diagram shows a cross-sectional view of a curved, elongated casing. A central frame (10) is shown with a series of rectangular slots. Two caps, labeled 12 and 13, are positioned at the ends of the frame, appearing to hold it together. A small rectangular element, labeled 1, is shown inserted into one of the slots of the frame.</p> </div>		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LJ	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

Accumulator device for an electric and/or electronic apparatus.

Description

FIELD OF THE INVENTION

The invention relates to an accumulator device for an electric and/or electronic apparatus comprising:

- 5 - an active element for charging and for producing the electric power,
- a casing for containing said active element.

The invention likewise relates to a type of portable radio telephone notably comprising such a device.

BACKGROUND OF THE INVENTION

- 10 A problem often faced with accumulators is caused by the increase of pressure during the charging operation. This increase of pressure becomes formidable with accumulators which use active elements notably of the lithium-ion type. To avoid the unwanted effects of this pressure, a robust casing is known to be provided for packing this active element. Metallic casings are then used which are considered too heavy and too costly.
- 15 This is considered disadvantageous.

It is suitable to note that certain accumulators need to have a certain pressure for operating properly.

- The invention proposes a device of the type defined in the opening paragraph for which the problem of rising pressure is solved in a satisfactory manner without costing too much and which thus does not have the drawback mentioned earlier.
- 20

SUMMARY OF THE INVENTION

Therefore, such a device is characterized in that said casing is curved, so that the increase of pressure occurring during the charging operation is counterbalanced.

- The invention is based on the recognition that a curved structure is used which is a robust structure and can thus easily withstand a growing pressure.
- 25

Thus, the advantage is obtained that the accumulator device can have a structure which is thin enough to recall that of bank cards.

These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 shows the various components forming the device according to the invention,

5 Fig. 2 shows an elevational view of the arrangement of the components of Fig. 1,

Fig. 3 shows the curvature of these components according to the invention,

Fig. 4 shows a first embodiment of the invention,

10 Fig. 5 shows a second embodiment of the invention,

Fig. 6 shows a third embodiment of the invention,

Fig. 7 shows an apparatus in accordance with the invention, on which an accumulator device has just been installed,

Fig. 8 shows a fourth embodiment of the invention,

15 Fig. 9 shows a fifth embodiment of the invention,

Fig. 10 shows a way of facilitating the curvature of the casing,

Fig. 11 shows a sixth embodiment of the device according to the invention, and

Fig. 12 shows a variant of the embodiment shown in Fig. 11.

20 DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1, the active element 1 is an element which presents itself in the form of a plate. Elements of this type are mentioned in United States Patents USP 5,047,300 and 5,198,313. Two electrodes 5 and 6 permit of charging and providing the energy. These electrodes may be bent according to the user's wishes. For protecting this active element 1
25 against the environment, a casing 9 is necessary. It is formed by a frame 10 and two caps 12 and 13. The active element 1 is placed inside the frame 10. The two caps 12 and 13 are flush-mounted with the walls of the frame 10, so that the active element 1 is inserted into the casing thus formed. The casing then has the form of a prism. Fig. 2 shows in an elevational view the casing with the active element inside it. The casing may be formed by plastic
30 material of which well-known bank cards are formed. One may thus obtain a very flat aspect of the device according to the invention which recalls that of bank cards or any other card of this type (telephone card etc.).

In accordance with the invention, said casing is curved as is shown in Fig. 3. Either this curvature is obtained by curving means which will be described in the

present memory and which control the resilience of the casing, or this curvature is final as a result of the initial concept of the casing.

For obtaining this curvature, the invention proposes a plurality of variants of embodiments.

5 A first variant is shown in Fig. 4. Two pins, or protrusions, 20 and 21, are provided on a side wall of the casing which is to be curved. A blocking part 25, which has two openings 27 and 28 for receiving the two pins in accordance with the curvature of the casing, maintains the curvature at the desired value. It will be evident that the invention also covers the fact that openings may also be made in the wall of the casing while pins are
10 provided on said blocking part. Instead of the part 25, a part 25' can be used whose form is such that it is aligned to the curvature it provides.

A second variant is shown in Fig. 5. A groove 30 is made in the wall of the casing intended to be curved. This groove may be obtained by having the caps 12 and 13 project from the frame 10 shown in a dashed line in Fig. 5. Another blocking part 35 which
15 cooperates with this groove has a rim 37 intended to fit in said groove 30 thus imposing the desired curvature. There too, without leaving the scope of the invention, the role of the groove and the rim may be exchanged.

A third variant is shown in Fig. 6. In this variant is used at least a ring 40 which has an opening, so that, when the casing is slipped into it, the ring imposes the
20 desired curvature. It is then possible to slip two rings on each one of the ends of the casing.

Fig. 7 shows an apparatus 48. This apparatus has a face 49 with a curvature. Thus the device according to the invention can profit from this curvature by conforming in shape thereto. Various fastening means can be provided in this case.

Fig. 8 shows a first one of these fastening means. A plate 52 maintains
25 the device on the inside of the face 49. This plate 52 is fastened to this face 49 at two fastening points 54 and 55.

Fig. 9 shows a second one of these fastening means. Two fasteners 60 and 61, for example, round the device according to the invention, fasten the device on the outside to the face 49. In the latter two cases it is also possible to use magnetic attraction
30 systems.

Fig. 10 shows a means for facilitating the curvature of the casing. Therefore, at least one of the caps 12 or 13 has grooves 70, 71, 72 ... which may be obtained by removing material, so that small ribs arise. Thus, the rigidity/flexibility ratio is changed in one direction.

This ratio may also be changed if raised edges 80 and 81, which rigidify the casing without hindering its curvature as this is shown in Fig. 11, are provided on the caps 12 and 13. These raised edges may be separate parts 80' and 81' which are stuck or soldered onto the caps as is shown in Fig. 12.

CLAIMS:

1. An accumulator device for an electric and/or electronic apparatus comprising:
 - an active element for charging and for producing the electric power.,
 - a casing for containing said active element,
- 5 characterized in that said casing is curved, so that the increase of pressure occurring during the charging operation of the active element is counterbalanced.
2. An accumulator device as claimed in Claim 1, characterized in that the casing has a cylindrical form that can be curved.
3. An accumulator device as claimed in Claim 1, characterized in that the
- 10 casing has a curved cylindrical form.
4. An accumulator device as claimed in Claim 1, for which said apparatus has a curved face, characterized in that the casing is curved around this curved face.
5. An accumulator device as claimed in one of the Claims 1 to 3, characterized in that it comprises curving means.
- 15 6. An accumulator device as claimed in Claim 5, characterized in that said curving means are formed by a system of pins and openings.
7. An accumulator device as claimed in Claim 5, characterized in that said curving means are formed by a system of groove and rim.
8. An accumulator device as claimed in Claim 5, characterized in that said
- 20 curving means are formed by at least a ring in which the device is slipped.
9. An accumulator device as claimed in Claim 4, characterized in that said curving means are formed by fastening means for fastening the device on the outside of said curved face.
10. An accumulator device as claimed in Claim 4, characterized in that the
- 25 curving means are formed by fastening means for fastening the device on the inside of said curved face.
11. An accumulator device as claimed in one of the Claims 1 to 10, characterized in that the casing comprises grooves on at least one side for facilitating the curvature.

12. An accumulator device as claimed in one of the Claims 1 to 11, characterized in that the casing has raised edges on at least one face so as to rigidify the casing in a direction other than that of the curvature.

13. A telephone comprising a device as claimed in one of the preceding

5 Claims.

1/4

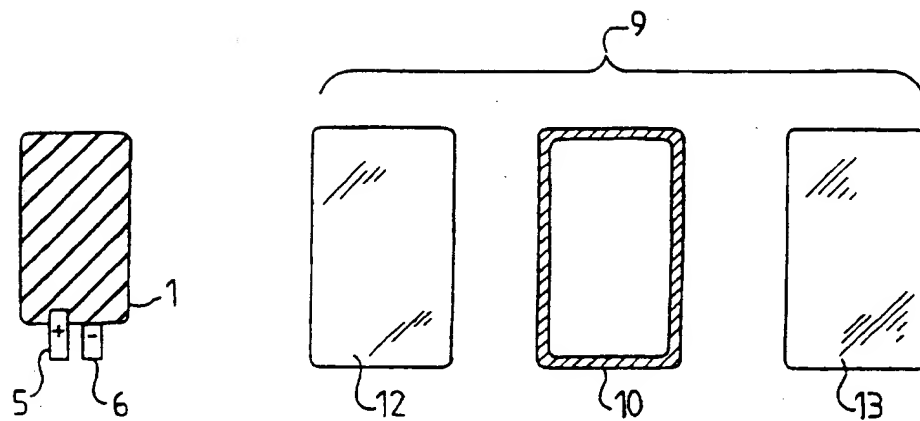


FIG.1

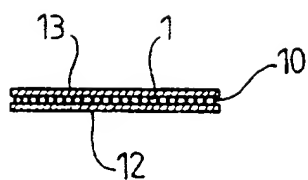


FIG.2

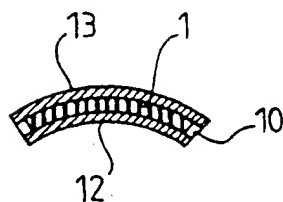


FIG.3

2/4

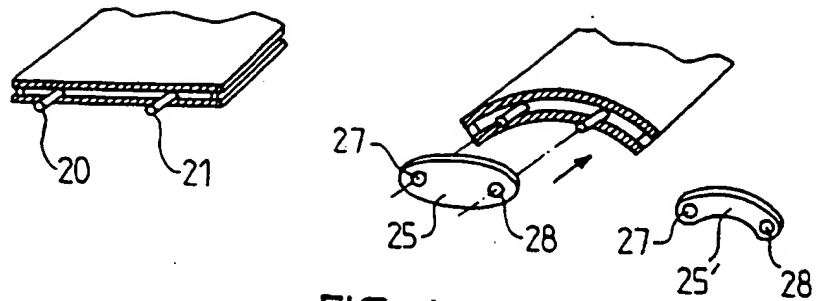


FIG. 4

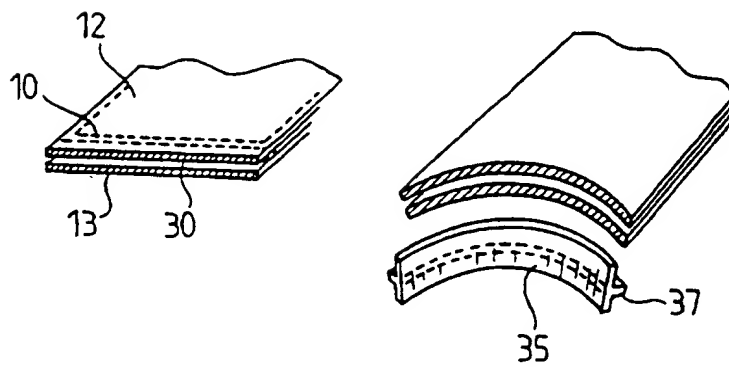


FIG. 5

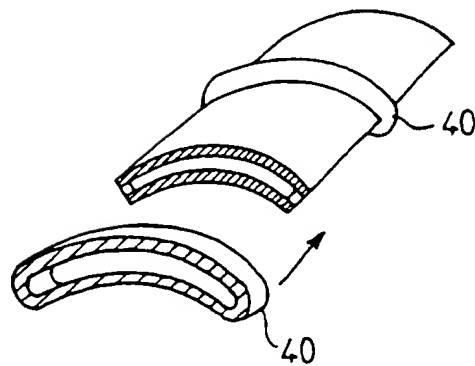


FIG. 6

3/4

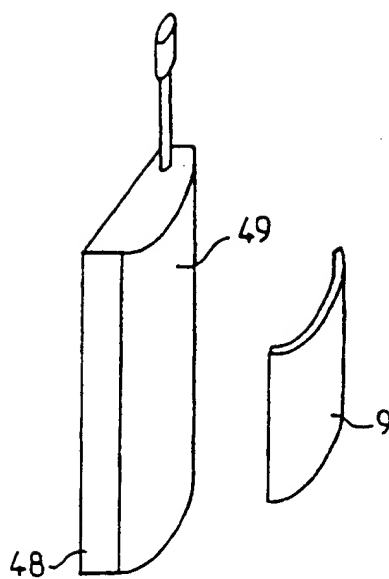


FIG. 7

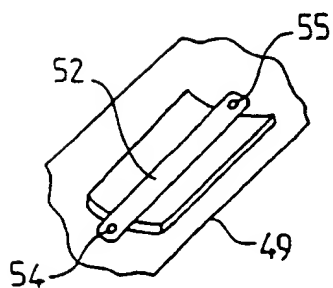


FIG. 8

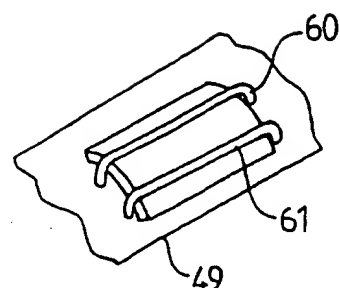


FIG. 9

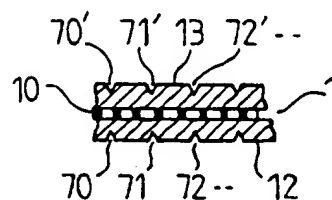
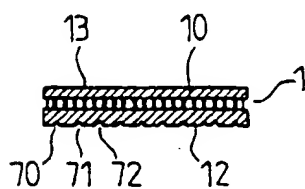


FIG. 10

4/4

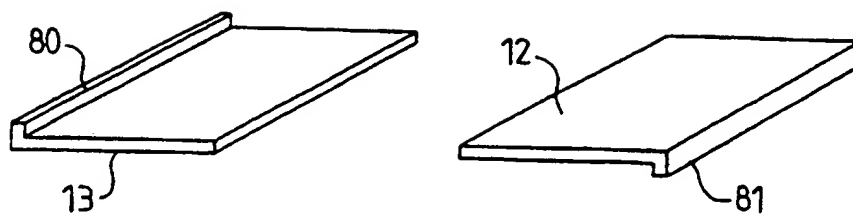


FIG. 11

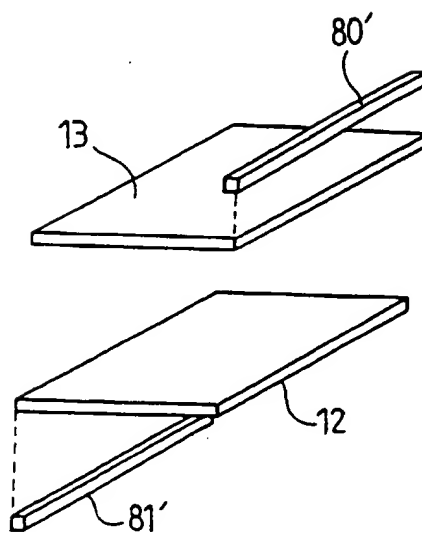


FIG. 12

INTERNATIONAL SEARCH REPORT

Inventor Application No.
PCT/IB 97/00339

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01M2/02 H01M2/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 91 03921 A (AT & E CORP) 21 March 1991 see claims 1-12; figures 1.5 ---	1-3
X	PATENT ABSTRACTS OF JAPAN vol. 008, no. 039 (E-228), 21 February 1984 & JP 58 197655 A (TOMOYUKI AOKI), 17 November 1983, see abstract ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 081 (E-307), 10 April 1985 & JP 59 211956 A (TOMOYUKI AOKI), 30 November 1984, see abstract ---	1-12

-/--

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

*** Special categories of cited documents:**

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another claim or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- *X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

27 June 1997

Date of mailing of the international search report

10.07.97

Name and mailing address of the ISA

European Patent Office, P.O. 5818 Patentplan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+ 31-70) 340-3016

Authorized officer

Battistig, M

Form PCT/ISA/210 (second sheet) July 1992)

INTERNATIONAL SEARCH REPORT

Intern. Application No.
PCT/IB 97/00339

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 011, no. 195 (E-518), 23 June 1987 & JP 62 022366 A (MATSUSHITA ELECTRIC IND CO LTD), 30 January 1987, see abstract ---	1-12
A	US 4 429 025 A (STOW MARK) 31 January 1984 see claims 1-16; figure 1 -----	9,10

Form PCT/ISA/210 (continuation of seized sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Application No.
PCT/IB 97/00339

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9103921 A	21-03-91	AU 6188690 A	08-04-91
US 4429025 A	31-01-84	NONE	

Form PCT-13A/210 (patent family annex) (July 1992)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

16

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.